



**Dual 3 Band, Mono 6 Band
Parametric Equaliser**

OPERATION MANUAL



Version - V1

April 2000

CONTENTS

| | | |
|-----------|---|------------|
| 1. | Introduction | Page 3 |
| 2. | Installation | Page 4 |
| 2.1 | Inspection and un-packing | |
| 2.2 | Operating environment | |
| 2.3 | CE standards | |
| 2.4 | Power requirements | |
| 2.5 | Signal levels | |
| 2.6 | External connections | |
| 3. | Warranty | Page 7 |
| 4. | Description of controls | Page 8 |
| 4.1 | Channel 1 | Page 8 |
| 4.2 | Channel 2 | Page 10 |
| 5. | Applications | Page 11-12 |
| 5.1 | Setting up and using the EQX20 | |
| | Audio sweetening and Precision equalisation | |
| | Removing subsonics | |
| | Making compressors frequency conscious | |
| | Special effects | |
| | Enhancing the EQ on a mixing console | |
| 6. | Circuit description | Page 13 |
| 7. | Specifications | Page 14 |
| 6. | Blank panel drawings | Page 15 |

The EQX20 is a two channel 3 band Parametric Equaliser which can also be configured as a single channel 6 band unit. Each band offers variable Frequency, 15dB cut and boost and variable Q (Bandwidth).

Having all parameters fully variable makes the EQX20 a powerful tool capable of a range of effects from subtle fine tuning through to radical tonal changes.

Each channel has a high pass filter switch intended to remove subsonics such as stage noise and tightening bass sounds.

The facilities provided by the EQX20 are summarised as follows -

- 2 Channel 3 band or single channel 6 band parametric EQ
- Wide frequency sweep (40:1) on each band
- Q variable between 12 (1/12th octave = 1 semitone) to 0.3 (3 octaves)
- ±15dB gain on each band
- High pass filter on each channel
- Bypass switching on each channel
- Balanced inputs on XLR and TRS jack
- Balanced impedance, ground compensated outputs on XLR and TRS jack
- +4dBu and -10dBV input and output levels
- Low noise and distortion

Typical applications for the EQX20 include -

- Audio sweetening
- Precision equalisation
- Feedback elimination
- Hum, subsonic and noise removal
- Making a compressor frequency conscious
- Special effects
- Enhancing the EQ on a mixing console

IMPORTANT: PLEASE READ THIS SECTION BEFORE USING THE EQX20

2.1 INSPECTION AND UNPACKING

The EQX20 has been carefully packed at our factory in a carton designed to withstand handling in transit. Should the unit appear to have been damaged in transit notify your dealer immediately and do not discard any of the packing. The carton should contain -

- The EQX20 unit
- Power cord
- Operator Manual (this book)

2.2 OPERATING ENVIRONMENT

The EQX20 is designed to operate between 0 and 50°C (32-122°F) with relative humidity no more than 80%. Should the unit be installed in an equipment rack, ensure that the environment conforms to these levels.

2.3 CE STANDARDS AND THE LOW VOLTAGE DIRECTIVE (LVD)

The EQX20 has been designed to meet the latest Electromagnetic Compatibility (EMC) regulations. However we recommend you do not operate the unit close to strong emitters of electromagnetic radiation such as power transformers, motors, mobile telephones or radio transmitters.

The unit should only be connected to a power supply of the type described in 2.4 POWER REQUIREMENTS or as marked on the unit. The unit must be earthed for safe operation. Disconnect the mains supply before removing any cover.

2.4 POWER REQUIREMENTS

There is a mains fuse located inside the unit which is accessed by removing the cover. This fuse is for protection against unit faults and as such will not normally need replacing. If you think you have a power related problem please refer to your dealer.

The voltage and fuse rating have been factory set for -

| | | |
|------|-------|-------------------|
| 230V | 50mA | UK |
| 220V | 50mA | Republic of Korea |
| 115V | 100mA | North America |

- The correct voltage and fuse rating is indicated on the rear panel.

- Please check that your unit is correctly rated for the voltage of the country of operation.

If the fuse requires changing at any time please ensure the correct fuse is fitted. An incorrect fuse could cause damage to the unit and may constitute a fire hazard.

If you carry your EQX20 from one country to another it is very important to ensure the voltage is compatible.

For your information the unit can be internally rewired for use in 230V, or 110-125V countries - contact your dealer for information. A special 100V version is available for Japan and a 220V, 60Hz version for Republic of Korea.

The mains lead connections to the appliance are coloured in accordance with the following code:

| | |
|------------------|---------|
| Green-and-Yellow | Earth |
| Blue | Neutral |
| Brown | Live |

- **WARNING: THIS APPLIANCE MUST BE EARTHED**

2.5 SIGNAL LEVELS

The EQX20 will accommodate both -10dB and +4dB operating levels without the need for level switching.

PLEASE NOTE: the XLRs are set for +4dBu and the TRS jacks for -10dBV operating levels. Use the appropriate connector/level to interface between your equipment and the EQX20.

Using the TRS jack input with +4dB signal levels in some set-ups will overdrive the EQX20 and cause distortion.

Signals in excess of +20dB will cause the unit to distort.

2.6 EXTERNAL CONNECTIONS

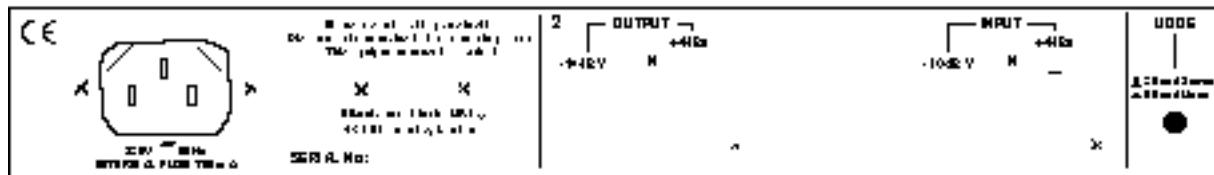
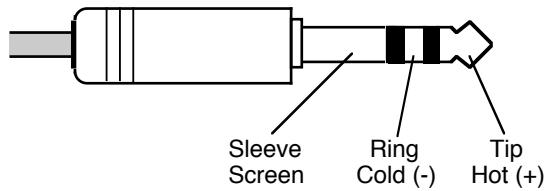


Fig 2.6.1 EQX20 rear view showing Input and Output connections

The input and outputs of the EQX20 are balanced on both XLR and 1/4" TRS jack connectors. For balanced input and outputs, connections to the unit should be wired as follows:

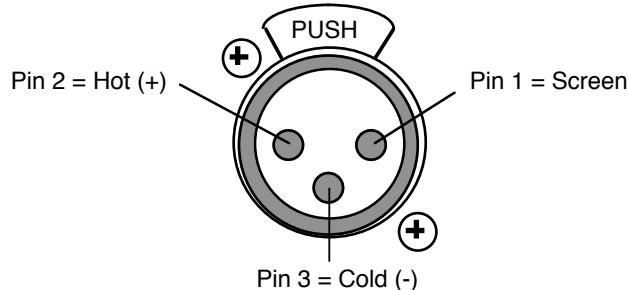
| | | |
|-----------------------|--------|------------------------|
| TRS jack-10dBV | Tip | Hot (signal +) |
| | Ring | Cold (signal -) |
| | Sleeve | Screen (signal ground) |

For un-balanced operation join Ring and Sleeve on input, output or both



| | | |
|------------|-------------|------------------------|
| XLR | +4dBu Pin 1 | Screen (Signal ground) |
| | Pin 2 | Hot (+ve) |
| | Pin 3 | Cold (-ve) |

For un-balanced operation join pins 1 and 3 on input, output or both



The 20kΩ input impedance of both inputs is suitable for most types of equipment.

Plugging a mono jack lead into the TRS input will effectively un-balance the signal connection.

3.0 WARRANTY

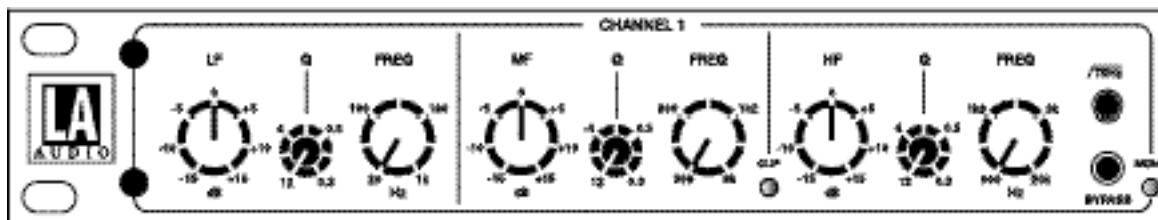
Your LA Audio EQX20 has been manufactured to a high standard using quality components. If correctly installed and operated the unit should give years of problem free operation.

However in the event of a defect in material or workmanship causing failure of the unit within five years of the date of original purchase we will agree to repair, or at our discretion replace, any defective item without charge for labour or parts. To receive service under this warranty it is necessary to return the unit to an LA Audio authorised service centre or to the factory with a dated receipt as proof of purchase. After repair the unit will be returned to you free of charge.

Limitations:

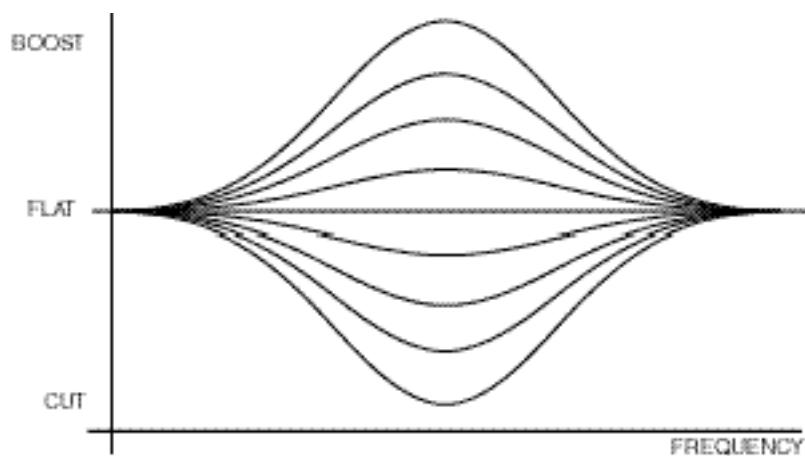
This warranty does not cover damage resulting from accident or misuse. The warranty is void unless repairs are carried out by an authorised service centre. The warranty is void if the unit has been modified other than at the manufacturers instruction. The warranty does not cover components which have a limited life, and which are expected to be periodically replaced for optimal performance. We do not warrant that the unit shall operate in any way other than as described in this manual.

4.1 CHANNEL 1



LF control

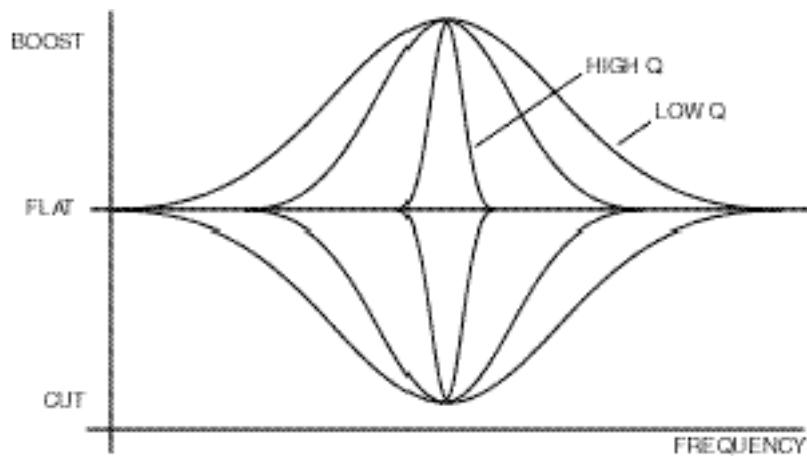
This control sets the amount of cut or boost for the LF (Low Frequency) section. Gain range on the EQX20 is $\pm 15\text{dB}$. The following diagram shows the effect of different cut and boost settings.



Maximum cut or boost occurs at the centre frequency set by the FREQUENCY control.

Q control

Varies the 'Q' (bandwidth) of the cut or boost region. A low Q, CW (clock wise) affects a wide band of frequencies whilst a high Q, CCW affects a very small band. The Q control on the EQX20 has a range of 0.3 (3 octaves) to 12 (1/12th octave). The following diagram shows the effect of different Q settings.

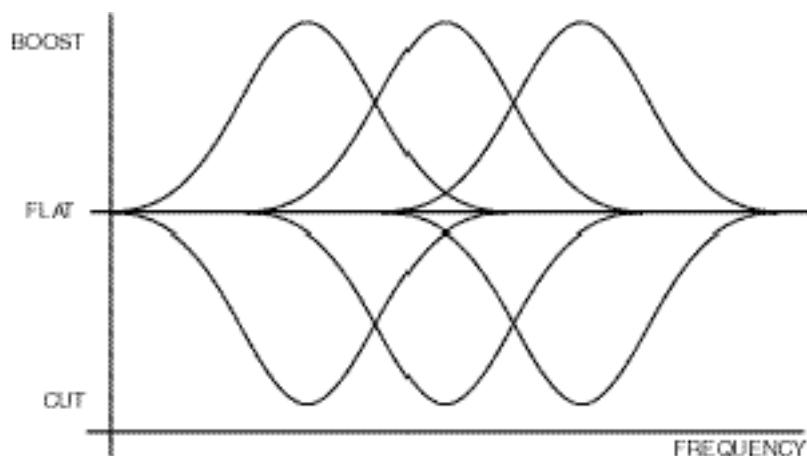


In general lower Qs are used when boosting and higher Qs when cutting - see applications

FREQUENCY control

This control adjusts the centre frequency for LF cut or boost

The LF FREQUENCY control has a 40:1 range and is adjustable from 20Hz, CCW to 1kHz, CW. The following diagram shows the effect of changing the centre frequency.



MF control

Sets the amount of cut or boost for the MF (Mid Frequency) section.

FREQUENCY control

This control varies the cut or boost centre frequency for the MF (mid Frequency) section. Control range is 200Hz, CCW to 8kHz, CW.

Q control

Varies the 'Q' of the cut or boost region for the MF section.

HF control

Sets the amount of cut or boost for the HF (High Frequency) section.

FREQUENCY control

Adjusts the cut or boost centre frequency for the HF section. Control range is 500Hz, CCW to 20kHz, CW.

Q control

Varies the 'Q' of the cut or boost region for the HF section.

CLIP led

The CLIP led monitors the last stage of the EQ section and indicates signal levels approaching clipping. The led lights at 3dB before clipping so momentary peaks are monitored but are not necessarily audible.

Excessive amounts of boost will cause the EQX20 to clip. Remember that overlapping boost from two sections can also accumulate and cause overload.

BYPASS switch

Pressing BYPASS switches the EQ out of the signal path and allows A/B comparison.

Remember if you are using any amount of boost, BYPASSing the EQ will cause a noticeable drop in signal level.

In MONO mode Channel 2 BYPASS is inoperative and Channel 1 BYPASS now switches the whole EQ in and out of circuit.

75Hz switch

Pressing this switch inserts a 75Hz, 12dB/Octave slope high pass filter into the signal path before the EQ section. Primarily intended to remove subsonic frequencies such as stage noise the filter can be used in conjunction with the LF EQ section to tighten a flabby bass sound - see applications.

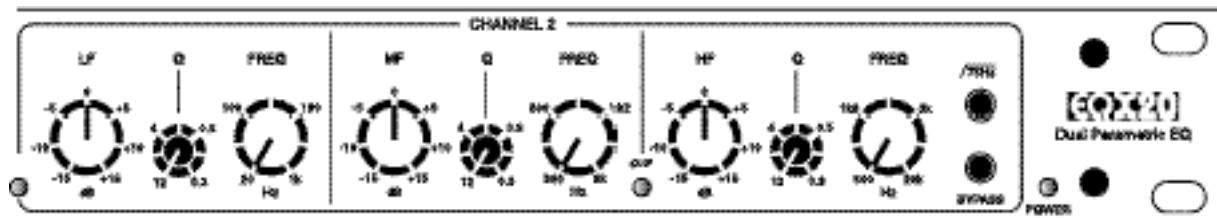
In MONO (6 Band) mode only the filter switch on Channel 1 is enabled.

MONO led

Pressing the MODE switch on the rear of the EQX20 lights the MONO led. This puts the two EQ channels in series to form a single mono 6 band unit. In this mode the BYPASS and 75Hz filter switches on Channel 2 are disabled. Channel 1 BYPASS now switches the whole EQ in and out of the signal path.

Your input signal should now go to Channel 1's input and the output taken from Channel 2's output. Channel 1 will still output signal but Channel 2's input is disabled - see applications

5.1 CHANNEL 2



Channel 2 is similar to Channel 1 except for the Input, BYPASS and 75Hz filter switch when used in MONO mode.

POWER indicator

The green POWER led is lit whenever mains power is supplied to the unit.

5.1 Setting up and using the EQX20

Refer to Section 2.6 External connections on page 5 for connecting to and from the EQX20.

Now unless you are familiar with operating parametric equalisers a good starting point will be

Set all Q controls to 12 o'clock, this gives a Q of around 0.5 (2 octaves) which is similar to that found on mixers fitted with fixed Q, swept frequency mid range controls. Use maximum (or nearly) boost so the effect of the EQ can be clearly heard and now sweep through the frequency range to find the area that needs attention. This is good practise even if the final solution involves cutting rather than boosting as boosting produces a more apparent effect of highlighting the hum, noise, boom or whatever. Gain and Q should then be adjusted to give the best subjective result.

In general low Qs (wide bandwidth) are useful for boosting without producing too much peaking or phasing effects. High and Low shelving type equalisation can be simulated by setting the HF and LF section Qs fully CW (0.3) and sweeping their associated FREQUENCY controls out towards the high and low frequency extremes.

High Qs are normally used for cutting sounds such as mains hum or certain feedback frequencies. In this application Q should be set as high as possible (narrow bandwidth). Lower Qs and cutting can be used for reducing boominess found with some acoustic guitars.

A good example of low Q cutting is reducing the 1kHz content of guitars and snare drums to leave a 'space' for the vocals to sit in. Often cutting in this way gives a better result than trying to boost the vocals to cut through. This usually has an added bonus that guitars can stay louder in the mix.

A compressor such as the LA GCX2 may also be used together with equalisation to bring a hidden vocal forward in the mix.

AUDIO SWEETENING and PRECISION EQUALISATION

The following are a few practical examples which should be treated as clues, with personal taste, source sounds and material you are creating deciding the final settings. There are no hard and fast rules, the most important tools in any equalisation process are your ears.

INSTRUMENT

BOOSTING

CUTTING

| | | |
|------------|--|---|
| Kick drum | Slap at 3-5kHz Bass at 40-125Hz | Floppy around 600-650Hz Boomy below 80Hz |
| Snare drum | Crack at 2-3kHz Body at 125Hz to 300Hz Bottom 80Hz | 'In the way' 1kHz |

| INSTRUMENT | BOOSTING | CUTTING |
|--------------------|---|--|
| Hi-Hat and Cymbals | Sparkle above 5kHz Ring around 250Hz | 'In the way' at 1kHz |
| Toms | Slap at 3.5-5kHz Bass 60-250Hz | Boomy around 300-350Hz |
| Bass guitar | Slap at 1kHz Bite at 2.5kHz Bass 40-100Hz | String noise at 1kHz Boomy at 125-220Hz |
| Acoustic guitar | Sparkle above 4kHz Body at 125Hz | Boomy at 200-250Hz Tinny at 2-3.5kHz |
| Electric guitar | Sex 600-900Hz Bass 125-250Hz Bite 2.5kHz Sparkle at 3-5kHz | Boomy below 80Hz 'In the way' 1-3kHz |
| Piano | Bass below 125Hz Presence at 5kHz | Tinny around 1-2kHz Boomy at 320Hz It's a sample above 6kHz! |
| Vocals | Presence 3-5kHz Cut through 8kHz Body 150-400Hz | Nasal at 1kHz Sibilance 7-10kHz Popping below 80Hz |

Those who have been paying proper attention will have noticed that on the same instrument there are suggestions for both cut and boost at the same frequencies! Well there's no accounting for taste.

REMOVING SUB-SONICS

The 75Hz high pass filter is useful for removing subsonics such as wind and stage noise and will often help produce a much tighter bass and vocal sound.

MAKING A COMPRESSOR FREQUENCY CONSCIOUS

Inserting the EQX20 into the side chain of a compressor such as the GCX2 will make the compressor more sensitive to certain frequencies. Examples of this technique are De-Essing and De-Popping.

SPECIAL EFFECTS

A passable telephone voice can be created by cutting frequencies below 300Hz and above 3kHz. Use the LF and HF sections, lowest Q (CW) setting and adjust their respective FREQUENCY controls accordingly.

Adding a high Q peak around 1kHz with the MF section will further enhance this effect.

ENHANCING THE EQ ON A MIXING CONSOLE

Patch the EQX20 into the insert points on your console to add further equalisation capabilities when treating individual sounds. Or patch into Group inserts for equalising sub-mixes or into the Stereo inserts for overall mix EQ.

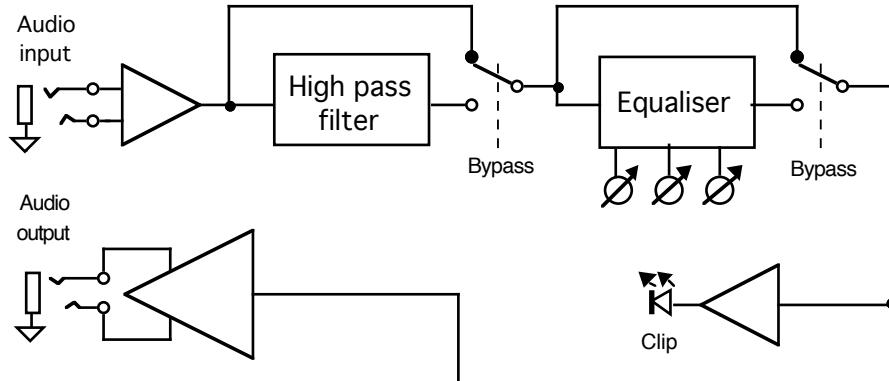


Fig: 6.0.1 Block diagram of the LA EQX20 showing the main signal paths

AUDIO PATH

The input signal first passes through the electronically balanced input stage which provides RF filtering and rejection of common mode noise signals. The signal then passes through the High pass filter and equalisation stages and is output via the ground compensated output amplifier.

FILTER

The filter section is a standard 2 pole, -12dB/octave high pass design optimised for minimum ripple in the pass band. The -3dB frequency for this filter is 75Hz.

EQUALISER

The equaliser section is based on a State Variable Filter which provides variable Gain, Frequency and Q with very little interaction between the controls. There are 3 stages in series for each channel.

OUTPUT

The output stage is a balanced impedance, ground sensing amplifier which provides level matching and a low impedance output. The outputs are also RFI protected.

MONO mode

In MONO mode the output of Channel 1, pre output stage is fed directly into the EQ section of Channel 2.

Signal is still output from Channel 1 but has not been affected by the EQ settings of Channel 2.

BYPASS and 75Hz filter switching is controlled by Channel 1, Channel 2's switches are disabled. Only one filter is used in this mode.

INPUTS

| | |
|---------------|-------------------------------------|
| Type | electronically balanced |
| XLR-F | +4dBu, wired pin 2 = hot (signal +) |
| 1/4' TRS jack | -10dBV, wired Tip = hot |
| Impedance | 20kΩ |
| Maximum input | +20dBu |

OUTPUTS

| | |
|---------------|-------------------------------------|
| Type | Ground sensing, balanced impedance |
| XLR-M | +4dBu, wired pin 2 = hot (signal +) |
| 1/4" TRS jack | -10dBV, wired Tip = hot |
| Impedance | 100Ω (+4dBu output) |
| Max. output | +20dBu |

PERFORMANCE

| | |
|--------------------|------------------------------|
| THD | < 0.01%, +4dBu output |
| Noise | < -86dBu (20Hz to 20kHz) |
| Frequency response | ±1dB, 20Hz to 20kHz, EQ 'in' |

CONTROLS

| | |
|------------------|--|
| GAIN | ±15dB |
| FREQUENCY | LF = 20Hz to 1kHz MF = 200Hz to 8kHz HF = 500Hz to 20kHz |
| Q | 0.3 (3 octaves) to 12 (1/12 octaves) |
| CLIP led | lights 3 dB before clipping |
| HIGH PASS FILTER | -3dB at 75Hz, -12dB/Octave |

POWER SUPPLY

| | | |
|-----------------|-------------------|-------------------------|
| Mains voltages | 230VAC, 50Hz, 6VA | Europe |
| | 115VAC, 60Hz, 6VA | North America |
| | 220VAC, 60Hz, 6VA | ROK |
| Mains connector | | Standard IEC receptacle |

MECHANICAL

Dimensions 1.75" (44mm)H x 19" (482mm)W x 6.5" (165mm)D
Weight Unit = 2.2kg, Shipping = 2.85kg

LA Audio reserves the right to alter any feature or specification without prior notice E&OE

